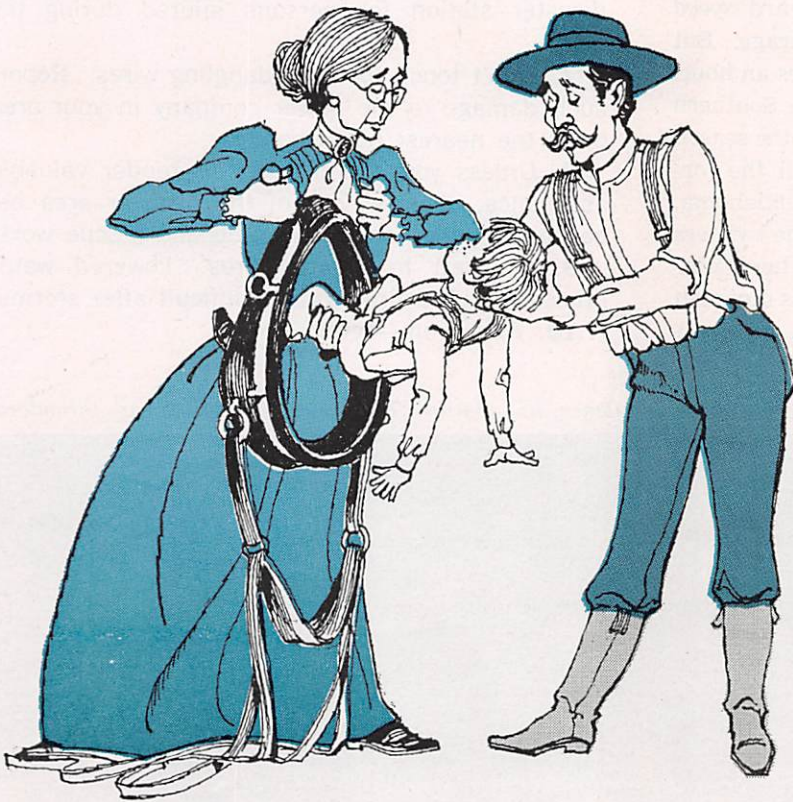


Granny Had a Cure for Everything

The fountainhead of folk medicine on the frontier was the granny. Her "cures" ranged from the merely weird to the outright disgusting.

by Richard Dunlop



A popular treatment for whooping cough was to pass the patient through a horse collar three times.

MALARIA was so common on the mid-continent frontier that it was not even considered an illness.

"He ain't sick," folks said. "He only got the ague."

In Illinois in 1836 they say a

family shook so violently with the ague that workmen shingling their roof felt the cabin tremble. A man might feel "languid, stupid and sore and down in the mouth and heel and partially raveled out," but even so, he rarely saw fit to apply one of the

hundreds of sure-fire folk remedies available for virtually every affliction and disease known to man. Calling a doctor, of course, was often out of the question because there might not be one in a hundred miles. Moreover, doctors were kept in reserve for a serious illness.

Miss Prudence Smith, who concocted a "List of Family Medicine Recipes" for her 1837 book *Modern American Cookery*—a best seller on the frontier and among families going west—described 43 illnesses. She suggested that her readers call a doctor only in case of smallpox, inflammation of the bowels, nosebleed, and gravel.

Miss Smith had advice to give for afflictions ranging from freckles, itch, toothaches, nosebleeds, coughs, and indigestion to whooping cough, hysterics, smallpox, cancer, and gravel. She suggested that for gravel, "Take the juice of horse radish made into thin sirup, mixing it with sugar, of which take a spoonful every four hours." A man could overcome cancer if he would "anoint the affected part several times a day with the expressed juice of the woolly-headed thistle or friar's crown."

For quinsy, she advised that readers "apply a large blister to the chest or between the shoulders and use gargles of sage tea, vinegar and honey; also bathe the feet in hot

hours closely following the warmest part of the day, generally about three to seven p.m.

The surface wind in connection with the development of the storms is usually from the southwest. Nearly two-thirds of all twisters move from that direction, that is, either from the southwest, west, or northwest. They have been known, however, to come from almost any direction, even stopping their forward movement, turning, and looping their path.

Tornadoes normally cover a small area, the average path being about 16 miles long and less than one-fourth mile wide. The chance of one striking any particular spot is extremely small. Many people live all their lives in a tornado belt and never see one. But those facts are not very convincing to anyone who has watched a spinning funnel dip crazily across the sky and then whip to earth with nuclear ferocity, leaving a path of death and destruction.

The longest officially recorded tornado traveled 293 miles in Illinois and Indiana on May 26, 1917, and lasted seven hours, 20 minutes. Its forward speed was 40 miles an hour, which is about average. But their speed has varied from five to 139 miles an hour.

Early in the year, tornadoes start in the Southern states, bordering on the Gulf of Mexico. As the season advances, they move northward. By April the tornado belt includes Texas, Missouri, and Oklahoma. During the peak period of May and June, the twisters move into Kansas and as far north as southern Minnesota. As the summer wears on, the storms diminish in frequency and intensity. (Continued on page 80)

10 RULES

That May Save Your Life

There are a number of things you can do, before and after a tornado. Here are a few:

1. Keep your radio or television set on and listen for late warnings and advisories from Weather Bureau bulletins.
2. Pay no attention to rumors. Rely only on official Weather Bureau advices and warnings.
3. Have flashlights and/or other emergency lights in working condition and keep them handy.
4. Check on everything that might blow away or be torn loose. Store underground as many loose items as possible. Loose objects on the roof are especially dangerous.
5. Be sure that a window or door can be opened on the opposite side of the approaching storm—usually the north and east sides of the building.
6. Seek medical care at hospital or Red Cross disaster station for persons injured during the storm.
7. Don't touch loose or dangling wires. Report such damage to the power company in your area or to the nearest policeman.
8. Unless you are qualified to render valuable assistance, stay away from the disaster area because you may hamper first aid and rescue work.
9. Be alert to prevent fires. Lowered water pressure makes fire fighting difficult after storms.
10. Above all—keep calm.

Down-bulging clouds, called mammatus, indicate severe turbulence, are features of serious thunderstorms, tornadoes.



water." If the swelling increased, leeches should be applied to the neck, and the throat should be fumigated with steam in which a little camphor has been dissolved. "Begin with an emetic of ipecacuaha," she urged.

Miss Smith believed in preventive medicine. Headaches, for example, could be avoided "by wearing the hair short and by washing the head daily with cold water; then rub head dry and expose it to the air." She suggested the novel idea that toothache might be prevented by keeping the teeth clean.

Grannies and mothers charged with keeping their isolated frontier families healthy also believed in preventive medicine. To head off tooth decay their methods were probably less effective but certainly more severe. Most believed that a person could preserve his teeth and eliminate mouth odor by rinsing his mouth every morning in his own urine.

Longer-range protection for the teeth could be obtained by a mother who during her baby's first six months rubbed his gums with the rattle of a rattlesnake or the brain of a rabbit. A rabbit's tooth suspended around the neck also warded off toothache. A string used to hang three mice could be looped around the neck with beneficial results.

In case all preventive measures proved ineffective and a tooth began to ache, then a man could always halt the pain by picking the offending tooth with a coffin nail, a splinter from a tree struck by light-



"To prevent backache, turn a somersault when the first whippoorwill calls."

ning, the middle toe of an owl, or a needle used in making a shroud. If the tooth had to be pulled as a last resort, the sufferer looped a string around his tooth and attached it to a bent sapling. When the sapling sprang back, away flew the tooth.

The fountainhead of folk medicine on the westering frontier was the granny, who grew in reputation with each wrinkle on her face as well as each cure she effected. Elderly Dr. R. T. Whiteman of Cambridge, Idaho, found the granny still practicing in his town when he was a young physician.

"Many a granny has used a mold scraped from cheese as an application to open sores," says Doctor Whiteman. "She got results, but she didn't know why. Today we derive penicillin from a certain type of mold. Some grannies applied wet tea leaves to a fresh burn, but modern medicine has substituted tannic acid solution, which is the active principle of tea leaves."

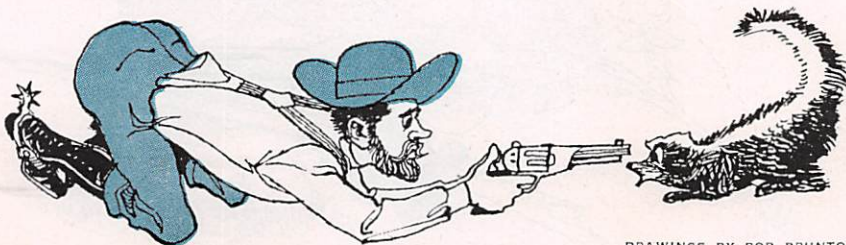
Grannies on the closing Idaho frontier of Doctor Whiteman's youth were still quilling a woman to make her deliver just as they were when the frontier crossed the Alleghenies a century before. They still inserted snuff into a woman's nose to make her sneeze and bring on labor. By then, however, they had given up such old wives' practices as speeding delivery by having the patient drink water in which nine eggs had been boiled.

If the baby had birthmarks, a granny counseled his parents that they could get rid of them handily enough. All they had to do was rub the marks with the hand of a corpse or the head of a live eel for three mornings in a row. Then they had to tie together three eel heads and hide them beneath a stone under the eaves of their house.

Parents in pioneer Texas employed less morbid methods. They believed that a birthmark would go away if somebody got out of bed early and licked the baby's mark three times for nine successive mornings without saying a word to anyone.

The inimitable Texas way of easing a babe through teething was to hand him a rattlesnake rattle or a six-shooter cartridge to chew on. There was some controversy as to which pacifier was the most efficacious, but most folks held that the rattlesnake rattle was best.

In case a small child wet his bed, ranch mothers had a ready cure. They fed him the hind legs of a rat fried nice and crisp. This possibly pointed to a shortage of mice in pioneer Texas because during the



DRAWINGS BY BOB BRUNTON

One Texan claimed he cured his consumption by living entirely on skunk meat.

period when the frontier crossed the Mississippi the favorite granny cure for the unfortunate child was to regale him with field mouse pie. Other frontiersmen of this period powdered a burned pig's bladder and spooned it into their offspring to get the desired result.

Each disease of childhood had its awesome folk remedy. To cure the croup, mother tied the right front foot of a mole around the child's



For snake bite, pioneers drank whisky, cut off snake's tail and then pressed it against the bite.

neck with a blue thread. If this did not work, she took a hair from the youngster's head and hid it in a hole in an ash or oak tree. Since this was believed to prevent croup until the child had grown to the height of the hole, it was common sense to find a hole as far off the ground as possible.

Whooping cough required the sufferer to be passed through a horse collar three times. Other children afflicted with this disease wore a stolen blue ribbon. Some parents reasoned that since their child had caught the disease, he ought to be able to give it away. They brought

a live fish to him to catch the whooping cough and then released it in the water. It was important for somebody to observe the pond or river to see if the fish came to the surface to cough. This, of course, was a sure sign that the fish was sick, and the child would get well.

Poisonous snakes were generally in good supply on the frontier, and pioneering families were ready with all manner of cures for snake bites. Texans employed an old Indian remedy. They immediately killed the offending rattlesnake, making certain he did not bite himself. They cut off his tail and placed the fleshy part against the bite. Mary Austin Holley, recalling the practice, says they would then remove the snake meat and "cut off another piece of the snake, about an inch long and apply it; this is repeated until the whole snake is used up. The poison, having a greater affinity for the flesh of the serpent than for that of the man, is soon extracted."

On the frontier popular fancy had it that the best treatment for snake bite required rigorous quantities of liquor. Doctor Whiteman says that ranchers in Idaho "soaked a cloth with whisky and wrapped it around a snake bite after slashing it open with a hunting knife." Dr. Samuel J. Crumbine reported a case in Kansas where he treated a man for snake bite while his friends, placing more faith in their own cure, plied him with drink. When he finished

the snake bite, the doctor had to treat the patient for inebriation.

Doctor Crumbine had no trouble saving his patient's life despite the mistaken assistance from his friends, but sometimes folk remedies wasted precious time. A rattlesnake struck an Oregon boy as he was walking through a grain field. His sister hurried him to a neighbor, who cut open a chicken and put his foot into the bloody insides to draw out the poison. Only then did they tie a tourniquet around the boy's knee and set off on horseback to see Dr. A. G. Pull, 16 miles away in Scio. They did not reach the doctor until three hours after the bite, and the boy died.

It seemed only reasonable to frontiersmen that the rattlesnake which inflicted such serious and painful bites could help cure disease. Backwoodsmen brought live rattlesnakes to snake "doctors," who extracted the oil and rubbed it into the patients' shoulders to rid them of the winter's aches. In some places a snake skin was wrapped around the neck to cure a sore throat. A man shook snake rattles to rid himself of a headache; if he was hard of hearing, he might shake the rattles and strain his ears to listen. The rattles of young snakes were considered best because they were smaller and harder to hear.



Dentists were as scarce as doctors, so backwoodsmen devised their own method of extracting teeth.

The fried heart of a rattlesnake could be eaten to cure consumption along most of the frontier as it moved westward, but Deaf Smith of Texas had a cure of his own. He claimed that the liquid ejected by a agitated skunk had supreme medicinal value. To get the benefit of the skunk, Smith killed it, removed its glands and roasted the meat on a stick over an open fire. He claimed he cured his own consumption by living entirely on skunk meat, but allowed that it might have helped because he lived between the Nueces River and the Rio Grande where winters are mild and summers cool.

Doctors find more merit in Smith's Texas version of the outdoor cure than they do in the way many middle border pioneers tried to cure consumption. They took a cow heel, two quarts of milk, nine ounces of hartshorn shavings, two ounces of isinglass, one-quarter pound of sugar candy, and a trace of ginger and cooked the mess in an oven. If eating this meal did not cure the consumption, a man could always dig a hole in the turf, climb inside it each morning and breathe the wet ground air for 15 minutes.

There were simples for every affliction. On the high prairies in the 1880's grannies urged that folks purify their blood with sulfur and molasses and ripen boils with bacon rind. Asafetida in a bag hung around the neck ward off contagion. A bag of asafetida or camphor around the neck also cured a cold, and so did a worn stocking or a bag containing a live spider.

There were various decoctions of herbs in alcohol known as bitters, which were principally given to women and children, although judging from the testimonials in the frontier newspapers, clergymen were not averse to taking a nip to calm their nerves before they inveighed against the demon rum from the pulpit.

There were secret charms, too, to ward off illness. These were often recorded in the family Bible or

passed from person to person from generation to generation. Usually the charm was given to a person of the opposite sex. If the charm failed then old wives always would say, "Tansy's good for a cowboy with rheumatism, but it won't do nothing for a shepherd."

Many pioneer families warred on



A border youth who wanted a mustache let a black cat lick cream off his lip.

disease according to the dictates of an involved system of signs and portents. Dr. Thomas McFarland of Alvin, Texas, was called to an out-of-the-way ranch where he arrived after dusk. Sick women and children were inside the log ranchhouse, and men, dogs, and cats occupied the porch.

"By the powers, doctor," said the rancher, "my folks are all sick and are going to die, and I want you to go at once, and I have not got time to wait."

The doctor refused to leave but stayed with the sick through the night. In the morning he asked, "Why do you believe they are going to die?"

"The owls have been hooting and the chickens have been cackling every night for the past two weeks,

and now my people are sick, and I know they are all going to die."

Doctor McFarland turned sleuth. He went out to the hen house, where he found an owl was in the roost among the chickens. The bird remained quiet until it got hungry. Then it gradually edged a hen off its perch, seized it before it hit the ground and flew away to devour its prey. Later it returned to roost with the chickens until it was dinnertime again. The doctor reported this to the rancher, who was amazed at this light-of-day explanation for the sounds he heard at night. The doctor went on to explain that it was the drafty ranchhouse that caused all the sickness.

"Your folks'll get better if you stop the cracks between the logs and the puncheons of the floor," he said.

Ranch hands collected moss and stuffed the cracks as the doctor directed. The cattle gathered around and patiently waited for the job to be finished. As soon as the men went indoors, the cows ate the moss out of the cracks, and the job had to be done over again. This time the rancher mounted guard with a rifle to make sure his cattle did not let the cold wind in on the family.

A man need not grow bald on the frontier. All he had to do was mix a quart of clean tar, a quart of honey or molasses in a pewter dish and heat for 20 to 30 minutes without bringing the mess to a boil. He skimmed off the tar and bottled the brew, which was so potent that grannies claimed a tablespoonful taken three, four, or five times a day as the stomach allowed would not only put hair on a man's head but on a woman's chest. In case the problem was simply to grow a mustache, all a middle border youth had to do was anoint his lip with sweet cream and have a black cat lick it off at midnight.

Pioneers in Oregon checked bleeding Indian style with cobwebs. Covered wagon women applied a poultice of wheat flour and salt for this pur-

(Continued on page 61)



Training in outdoor cooking, as well as outdoor living, is offered by groups like the Girl Scouts.

Cookout Tips From Teen-Agers

The younger generation is turning some of America's favorite foods into cookout specialties that spell good eating for any age group.

WITH THE FIRST ROBIN comes the cookout season for active teen-agers. From California to the Atlantic, from Maine to the Gulf, the charcoal grill and the campfire challenge American boys and girls to outdoor activity in the 1963 manner.

Parents, teachers, and community leaders encourage this youthful rebellion against eating indoors. Whether on the patio, in the woods, in a national park, on the beach, or at the river bank, this short migration of teen-age hordes, equipped with pans and pots and grills and bags of ingredients, fits happily into the President's campaign for physical fitness.

What do these young cooks prepare over charcoal

by Gaynor Maddox

with the cooperation of the Department of Foods and Nutrition of the American Medical Association

or campfire? Many of them are wiser than you think. They eat well. The girls, particularly, are weight conscious. Great numbers of these teen-agers were, or still are, Boy Scouts, Girl Scouts, Campfire Girls, or members of other youth organizations. They have learned cookout know-how. Their meals are good. Adults are fortunate when they are invited to come along.

Throughout the country 4-H Clubs encourage out-

Granny Had a Cure For Everything

(Continued from page 33)

pose. A nosebleed on the pre-Civil War frontier called for more strenuous measures. The sufferer could chew paper, tie an eelskin to his arm, remember who sat in the next pew at the last church service, or let three drops of blood fall three times on a shovel heated in the fireplace and then wipe them off.

On the middle border people bathed a wound in the head in cold cider vinegar and tied it in a bandage of squirrel brains and ginseng leaves. Doctor Whiteman says that Idaho old-timers "used to apply a big wad of chewing tobacco to a badly cut leg or arm." Of course, folk practitioners who believed in preventive medicine could head off a wound in the first place. All a frontiersman in the Northern forests need do was fasten the right eye of a wolf inside his right sleeve.

As proof against mad dogs, mid-continent settlers ate bread and butter sandwiches in which they had inserted a hair of a dog. All along the frontier people carried madstones as protection. If lockjaw developed, Dr. William Wolf of Fredericksburg, Texas, learned there was a sure cure. He hurried to see a youth who was foaming and in agony. The doctor told his distracted mother that he feared it was lockjaw.

"Oh, I'm so glad it is lockjaw," she replied. "I thought it was fits."

The doctor allowed that lockjaw was pretty bad, but the mother remained unworried because as she joyously explained, her boy would get well as soon as she gave him a good cup of cockroach tea.

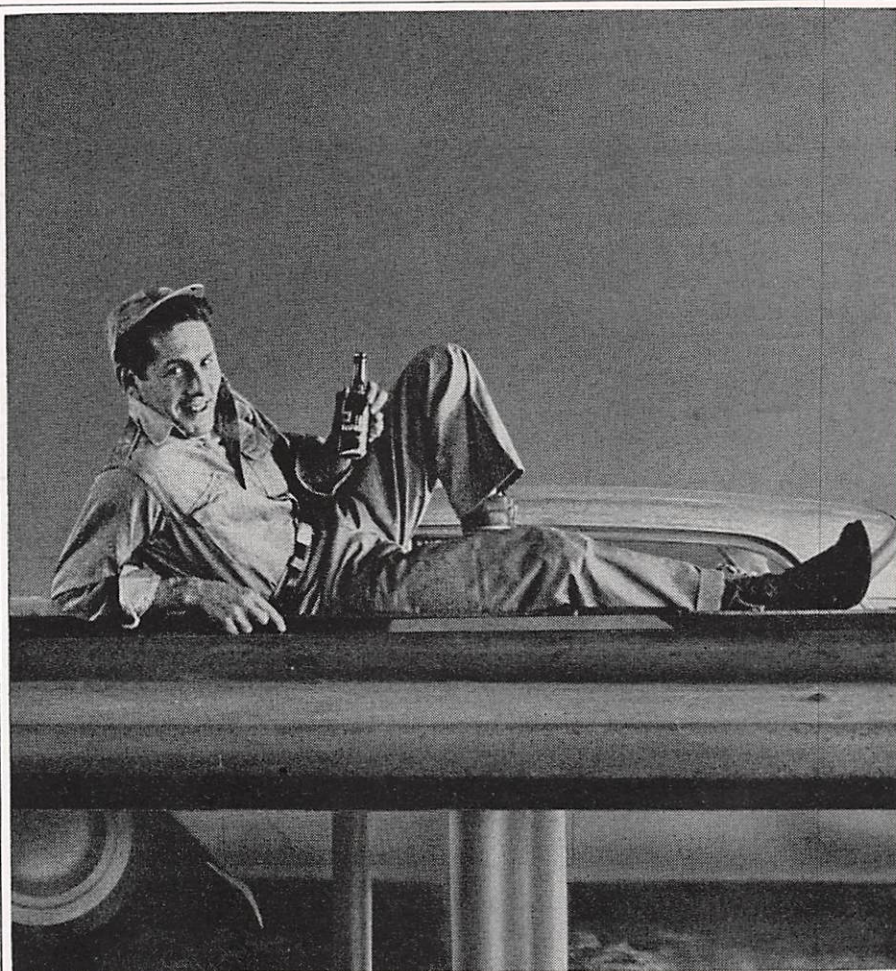
Sliced onions concealed around a bedroom kept away illness. An onion in the pocket prevented smallpox. If afflicted by mumps, rub the swelling against the hog trough. Warts, as any small boy still knows, could be cured by touching them to the warty skin of a toad, but grannies assured the faithful that they would also vanish if rubbed with green walnuts, slit beans, corn, the family dishrag, bacon rind, or chicken feet.

The number nine had curative powers. Nine gooseberry thorns touched to a sty would remove it in a jiffy. A snake's head and tail applied to a wen nine times dried it up, although it was considered necessary to say "amen" each time. Touch a ringworm nine times with a thimble and it would vanish.

Southwestern frontiersmen used the lobelia plant both for an emetic and a purgative. Peel the plant up, and the sickness in the bowels would come up. Peel the plant down, and

the sickness would go down. They chose the May apple root because its forked roots looked like a man's legs, and its stem resembled his body. The trick was to use the part of the root which resembled the afflicted part.

Sometimes young frontier doctors were given a few constructive suggestions from old grannies. These varied in their usefulness. Dr. Felix Collard, Wheelock, Texas, met a lady riding down to the forks of Camp Creek. (turn page)



Need a lift? Try a Lively Soft Drink

Industrial studies have shown that the benefits of a soft drink break are twofold: it provides a needed psychological lift and relieves two of the physical causes of fatigue—lowering of fluid reserve and shortage of carbohydrate.

Students, housewives, professional men, children are also subject to periodic slumps in energy. Carbonated beverages, with 75 to 100 quickly convertible energy units per serving, provide ideal refreshment when it's time for a break.

For free booklets on "The Story of Sparkling Soft Drinks" and "Liquids for Living," write:

American Bottlers of Carbonated Beverages, 1128 Sixteenth St., N.W., Washington 6, D. C.

"Be you a doctor?" she asked.

"Yes, I'm a practicing physician."

"Do you know anything about pneumonia?"

"Yes, I can recognize the symptoms and signs and know something of the treatment."

"Well, do you know a sure cure for pneumonia?"

"I fear I do not."

"Well, you are a young doctor, and I want to help you along and I want to give you a sure-shot cure for pneumonia. It's black cat tail tea. Find the blackest cat that you are able to find and cut off his tail and make a tea and mix it about half and half with good red liquor and have it hot. Give one tablespoonful every 10 minutes until the patient goes to sleep. The only times I've known it to fail was when the cat wasn't black enough, the tail wasn't long enough, or the patient didn't get the cure soon enough."

The granny might have added that blood from the amputated tail could also cure a rampaging case of shingles.

Prudence Smith's cure for a headache sounds tame compared to the frontier notion that a headache would disappear if a man tied around his neck a rope used in a suicide or hanging. There was no need to suffer from a fever either, because it was only necessary to eat some soup and feed the rest to a black cat to abate the fever. More providential folks, however, ate three hard-boiled eggs on Good Friday or held in their hand the first three hailstones of the spring to make themselves immune to fever for a whole year.

Stringent remedies were used for diseases that did not even exist. Most fearful of these imaginary illnesses was the "go-backs." A woman brought a sickly little girl to Dr. Lewis J. Moorman in Oklahoma and told him that she had the "go-backs."

"How do you know?" asked the surprised doctor.

"Because I have measured her and her body is not seven times as long as her foot. You know that is a sure sign."

She refused to let the doctor ex-

amine the girl and prepared to ride away.

"Well, I've tied a string around the buggy wheel," she said, softening a little. "If she is no better when that wears off, I will bring her back."

Other diseases were real enough, but folks living in the backwoods were understandably uncertain of their causes. Typhoid was believed by some to be caused by night air and by others to be the result of putrid vegetation and animal matter in the atmosphere, grief, fear, unripe fruit, even lack of sleep or too much thinking. Dr. John Evans' and Dr. Daniel Drake's theories about cholera were unknown on the frontier except to a few educated men, and most victims of this fearful disease could only put their feet in hot ashes and water, take 10 grains of calomel and one of opium, and cover up in bed with hot bricks and boiled ears of corn.

The incredible cure concocted by an ersatz Kentucky frontier doctor, Richard Carter, covered a whole army of afflictions. Said Carter: "Take a young fat dog and kill him, scald and clean him as you would a pig, then extract his guts through a hole previously made in his side and substitute in the place thereof, two handfuls of nettles, two ounces of brimstone, 1 dozen hen eggs, 4 ounces of turpentine, a handful of tansy, a pint of red fishing worms, and about three-quarters pound of tobacco, cut up fine; mix all these ingredients well together before depositing in the dog's belly, and then sew up the whole, then roast him

well before a hot fire, save the oil, anoint the joints and weak parts before the fire as hot as you can bear it, being careful not to get wet or expose yourself to damp or night air, or even heating yourself, or in fact, should you not expose yourself in any way."

This remedy was good for gout, rheumatism, cramps, and infirmities of the sinews and joints. Probably no less efficacious and certainly simpler was the practice of curing rheumatism by carrying such oddments as a coffin nail, a potato, horse chestnut, and a ham bone in the pocket, a rattlesnake rattle around the neck, or a salted mackerel tied to the feet.

Down in Texas, Dr. George Bond of Hillsboro was treating an old lady on crutches for rheumatism, but she quit coming to see him. He met her walking on the street one day.

"What is the reason you do not come to the office?"

"I do not need to come any more. I can walk now. All my life I have heard that the sting of a bee on the heel would cure rheumatism; last week I stepped on a bee, and I am cured."

Pioneers ate a dainty portion of the leaves and roots of poison ivy in the spring to guard themselves against the plant's effects for the rest of the year. They tied a white woolen cord around their ankles to prevent ground itch.

Walk around the house at midnight to alleviate asthma; cure convulsions by pouring baptismal water on a peony bush; capture a yellow toad in the neighbor's cellar and

U.S.P.H.S. Stops Germs at the Border

THE UNITED STATES recently marked its 15th straight year without an outbreak of quarantinable disease known to have been introduced from abroad. The Public Health Service, in making this announcement, listed the quarantinable diseases as smallpox, yellow fever, cholera, plague, louse-borne typhus, and louse-borne relapsing fever.

"This achievement is particularly noteworthy," said Surgeon General Luther L. Terry, "in view of the

steady climb in the number of persons entering the United States who have been in parts of the world where the quarantinable diseases are common, and in view of the increase in the speed of air transportation."

In fiscal year 1962, the PHS's Division of Foreign Quarantine inspected more than 32,000 ships, 65,000 aircraft, and 16.7 million travelers, including 10.6 million local Mexican border crossers.

place, it on the throat and quinsy will go; for each year of his age hang a slice of peony root on the right arm and left foot of an epileptic and when the last piece falls off, he will be well; eat fishworms to end heartburn; throw a shovelful of hot coals over the affected parts to destroy erysipelas; boil the heart of a barn swallow in milk and wear it around the neck and the memory will clear; prevent a backache by turning a somersault when the first

whippoorwill calls through the spring glades—so sounded the threnody of granny medicine through the dark forests, across the plains, the deserts and over the high mountains to the Western sea. END

EDITOR'S NOTE: This article was adapted from the forthcoming book, *Doctors on the Frontier*, by Richard Dunlop, to be published by Doubleday & Company, Inc., 575 Madison Avenue, New York 22, New York.

Hydrocephalus: The Water That Kills

(Continued from page 53)

dogs, and cats. Not until two and a half years later did he have a shunt tube which he felt could safely be implanted in a human patient.

"We have used three types of shunt systems in babies," says Doctor Pudenz. "The first had a plastic (Teflon) sleeve valve at the end. We later began to use a silicone rubber shunt tube developed by Ted Heyer, a Santa Barbara, California, engineer. In 1961, Rudolph Schulte, also an engineer, added a small flushing device which improved the shunt system."

The tube worn by little Mark Harbaugh is one of the type developed by Doctor Pudenz and his engineering team. Technically it is known as the Pudenz Ventriculo-Atrial Shunt. More than 3000 of them have been used to date.

Another pioneer in the development of shunts for the treatment of hydrocephalus is John Holter, who first became interested in the disease in 1956. This Philadelphia technician had a special reason for his interest: his infant son, Casey, whose life was threatened by water on the brain.

At Philadelphia's Lankenau Hospital, Doctor Spitz operated on Casey and implanted a shunt tube which discharged the excess fluid into the baby's stomach. But 10 days later, the tube became clogged, and a second operation was necessary. This failed, as did a third and a fourth operation. The tube kept clogging, and the pressure on Casey's brain continued to mount.

A surgeon described for Holter a

possible solution—a tube leading from the cranium to the jugular vein in the neck to allow the cerebrospinal fluid to be absorbed into the blood stream. To make this work, the tube should be fitted with a valve which would open whenever pressure within the brain reached a certain point, then close to prevent backflow of the fluid. The doctor pointed out that several models of such tubes had been tried without success.

In his job at the Yale & Towne Research Center, Holter had often worked with hydraulics. He thought he could devise an effective tube. Working 18 to 20 hours at a stretch in his company's laboratory, and using physiological and anatomical specifications outlined by Doctor Spitz, Holter designed a new kind of tube.

It was three inches long and 3/16 of an inch in diameter and was fitted with two nipple-like valves. The use of two valves was an extra safeguard against backflow and gave the tube a pump action.

The doctors at the hospital were enthusiastic, but pointed out that the plastic tube would not withstand the high temperatures (up to 260° F.) needed for sterilizing. The tube would shrink and ruin the valves, which were designed to tolerances of only 3/10,000 of an inch.

Holter tried other plastics, but none of them worked. Then he made a tube of silicone rubber, a new material which had been used in recent heart operations. Weeks later, with Casey close to death after his four brain

operations, he completed the shunt system in time to save the boy's life.

Tragically, however, Casey's fourth operation—during which his heart had stopped beating for some minutes—had left him with severe brain damage. Although the hydrocephalus was under control, the boy was paralyzed and subject to convulsions. Four years later, a few weeks before his fifth birthday, he had a convulsion in the bathtub and drowned.

Since 1956, the Holter Ventriculo-Caval Shunt Valve has been used in several thousand patients in more than 40 countries.

A shunt is not implanted if the neurosurgeon believes that in a reasonably short time the dammed-up fluid may drain away naturally. This often happens. But to save eyesight, intellect, and life, the head circumference of the stricken child must be carefully checked.

Doctors examine the tiny patient once a week and make a graph of the maximum head circumference measurements. This graph is then plotted on a special chart which shows the curves of normal head growth for male and female infants. If the growth curve shows no tendency to revert to the normal range, surgery is performed and a shunt is implanted in the child's head.

In recent years, recourse to shunt surgery has increased. The cases of Diane and Mark are typical. Medical authorities say that about 20,000 of these dramatic operations have been performed throughout the world. Two reasons for the growing frequency with which this technique is used are the great improvement in the functioning of the shunt and a substantial reduction in its cost of manufacture.

Shunt surgery in hydrocephalus has progressed so rapidly in recent years that, while the operation is still major surgery, the operative mortality rate is "very slight," according to Doctor Spitz, who, in addition to his work at Children's Hospital, is associate professor in pediatric neurosurgery at the University of Pennsylvania Graduate School of Medicine.

"The shunt technique," he explains, "is one of the safer things we perform today in pediatric neurosurgery. The operative mortality is less today than

in appendicitis, which is about one per 100 patients.

"If our aim is to preserve normal mentality in these hydrocephalic infants and children, I think the vast majority of them will need some variety of decompressive shunt surgery," says Doctor Spitz. "This business of parents waiting a long period of time to see if their child's head will ultimately stop growing usually results in permanent mental defects. In these cases, time is of the essence in the preservation of brain function. Waiting is most often dangerous."

Despite all the progress that has been made in treating this crippling birth defect, authorities warn that much remains to be done. In some cases of obstructive hydrocephalus, a shunt tube cannot be expected to operate satisfactorily for more than two years, and some infants will require one or more revisions of the shunt during this time.

Furthermore, cautions Doctor Pudenz, simply arresting the condition with a shunt tube will not assure the normal mental and physical development of all patients.

"A significant percentage," he says, "have sustained irreparable brain damage or have associated congenital nervous system defects. Therefore, many of them will have convulsions, mental retardation, spasticity, disturbances of growth, and other signs of neurological deficit. To keep these problems at a minimum, we should not permit the hydrocephalus to advance to the point of irreparable damage to neurons."

This means, of course, that the final solution has not been found. Parents must be educated to seek medical advice for any suspicious condition in infants. Researchers must continue to seek better methods of treatment. Among the latest developments are two new procedures for helping to reduce to near-normal size the grossly enlarged heads caused by hydrocephalus.

One is a helmet device which molds the head on the same principle as the head-wrapping practiced by some primitive tribes. The other involves removal of inch-wide strips of bone from the skull. According to Dr. Martin P. Sayers, neurosurgeon-in-chief

at the Birth Defects Clinical Study Center, Children's Hospital, Columbus, Ohio, both are used in conjunction with fluid draining procedures.

These two developments, along with many other research projects, were financed by grants from the National Foundation-March of Dimes, one of the most active organizations now seeking causes, cures, and preventives for the dozens of kinds of birth defects which cripple 250,000 infants annually in the United States. A total of 31 birth defects treatment centers and six research centers are financed by March of Dimes funds.

In hospitals, clinics, universities, and medical centers across the nation, research goes on continuously to learn more about what causes hydrocephalus to develop in unborn children, how the cerebrospinal fluid is formed in the brain, how it is absorbed, how absorption can be improved, and how

formation of fluid can be decreased.

When you ask investigators about the prospects of better solutions to hydrocephalus, they tell you that the outlook is bright. But they remind you that it takes time—time to test new materials, drugs, techniques, and procedures on laboratory animals before they can be declared safe and useful for children.

Yet there is every reason to believe that year after year a greater proportion of babies stricken with this cripple-killer will have a chance to become normal adults. END

FOR FURTHER READING

A booklet entitled "An Introduction to Your Child Who Has Hydrocephalus" is available at 20 cents a copy from the Department of Pediatrics, School of Medicine, Loma Linda University, Los Angeles 33, California.

Ahead: Summer Week Ends

(Continued from page 49)

Inexpensive ones for the children can be purchased for as little as \$8, and a good one for an adult may cost \$30.

Sleeping bags not only help campers get a good night's rest, but they also roll into neat packages that can be packed easier than other bedding.

Most modern sleeping bags are filled with synthetic fibers. Higher priced bags generally contain the higher quality fibers. It is important that the filler material be new and not re-used or re-processed. For the average summer climate, an adult-size bag with three or four pounds of virgin fiberfill will usually be plenty warm. Vacationers heading for the higher country may need a heavier sleeping bag.

Beneath each of these sleeping bags the camper needs either a cot or air mattress. Air mattresses are more commonly used and more easily packed. You can get either a rubberized cloth air mattress for \$12 to \$15, or a plastic one for \$4 to \$8. The plastic isn't as rugged, and is more difficult to repair. A lot of the air mattresses coming to the market

these days even have built-in foot pumps to make fast work of inflating them.

A couple of small flashlights should provide all the light you need for your first week ends of camping. Later, as you plan longer camping vacations, you will want to include a camp lantern.

Worried about camp cooking? Modern developments have simplified this chore too. A wide variety of camp stoves will give you an excellent cooking fire in a hurry. Most common is the two-burner gasoline stove. Women sometimes find the home-like flame of the propane stoves easier to use.

Also consider a charcoal grill, preferably one that folds flat for easy packing. An entire evening meal can be cooked on the charcoal—steaks or hamburgers, roasting ears, baked potatoes, and coffee. And food seldom tastes better.

You can take cook pans, skillet, and coffeepot from the home kitchen. But as you get into camping you will want to add a set of nesting camp pans to your equipment. Cut out a lot of the